

A new species of *Tropidonophis* (Serpentes: Colubridae: Natricinae) from the D'Entrecasteaux Islands, Papua New Guinea

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Abstract.—We describe a new species of natricine snake of the genus *Tropidonophis* from the D'Entrecasteaux Islands, off the southeastern peninsula of New Guinea. The new species is large, with 15 un-reduced scale rows, a high ventral and low subcaudal scale count, and a distinctive color pattern of dark mid-dorsal bands and offset lateral blotches on a yellow or brown ground color. The species is known from two specimens collected at 900–1090 m in primary lowland hill forest. Close relationships with other members of the genus are not apparent.

The natricine genus *Tropidonophis* consists of 18 species of small to medium-sized snakes distributed from the Philippines (two endemic species) to the Bismarck Archipelago (two endemic species), with 12 species found on New Guinea and its offshore islands, four in the Moluccas, and one in Australia (Malnate and Underwood 1988). The genus is thought to be most closely related to the Southeast Asian *Xenochrophis* on the basis of shared scalation, hemipenial, and osteological features (Malnate and Underwood 1988). Most *Tropidonophis* species are nondescript, frequently with a uniformly dark dorsal ground color of brown or gray, sometimes with darker spots, short lines, or narrow bands. Some specimens of a few species have more conspicuous patterns of dark bands on a lighter ground color (cf. O'Shea 1996: 95). *Tropidonophis* species typically inhabit rainforest, occur from sea level to 2200 m (Malnate and Underwood 1988), and are reported to dwell frequently near permanent water sources (O'Shea 1996).

During the course of conducting biological surveys in the D'Entrecasteaux Islands in 2002 we collected a strikingly colored specimen of *Tropidonophis* that is un-signable to any currently recognized spe-

cies. A search of museum collections revealed another specimen belonging to the same taxon. We take this opportunity to provide this species with a name.

Materials and Methods

Specimens were collected under applicable national and provincial permits, fixed in 10% buffered formalin, and transferred to 70% ethanol for storage. Measurements were made to the nearest mm in the field with a fiberglass tape; mass was measured to the nearest gram in the field with a Pesola scale. Diagnostic features and comparisons to other species were based on data provided in the comprehensive study of *Tropidonophis* by Malnate and Underwood (1988) and by reference to specimens housed in the Bernice P. Bishop Museum, Honolulu (BPBM).

Specimens are deposited in the BPBM and American Museum of Natural History (AMNH).

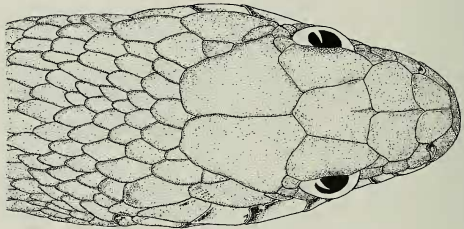
Tropidonophis dolasii, new species

Figs. 1, 2

Holotype.—BPBM 16539 (field tag FK 6118), adult female, collected by D. Salepuna on E slope of Oya Tabu (Mt. Kilker-



A



B

Fig. 1. (A) Lateral, and (B) dorsal view of head of holotype (BPBM 16539) of *Tropidonophis dolasii*. Scale bar equals one cm.

ran), 9.4555°S, 150.7857°E, 1090 m, Fergusson Island, Milne Bay Province, Papua New Guinea, on 23 August 2002.

Paratype.—AMNH 73979, adult female, collected by L. Brass on E slope of Goodenough Island, 900 m, Milne Bay Province, Papua New Guinea, on 27 October 1953.

Diagnosis.—A large species of *Tropidonophis* with 15 dorsal scale rows at mid-body and one head length anterior to the vent, 161–162 ventrals, 63 subcaudals, 2 preoculars, 3 or 4 postoculars, 8 supralabials, 8 or 9 infralabials, no postocular dark stripe, and yellow or brown ground color

with vaguely defined mid-dorsal black bands offset by lateral black blotches on scale rows 1–4. These dark bands and blotches are not solid, rather they are formed by a network of darkened scale margins.

Description of holotype.—Adult female. Dorsal scale rows 15 (reduction to 15 rows occurs at the level of the 15th ventral); all rows except first keeled; first row weakly keeled on those scales posterior to approximately 15 ventrals anterior to vent; keels on dorsal scales more weakly developed anteriorly and laterally and more strongly de-

veloped posteriorly and dorsally; paired apical pits obvious on those dorsal scales retaining the horny epidermal layer; all dorsal scales, except on first row, notched at the posterior tip. Rostral twice as wide as high; internasals longer than wide; prefrontals wider than long, as are frontal, supracaudals, and parietals; lateral extension of parietal contacts middle postocular, excluding upper postocular from contact with anterior temporals on each side. Nasals divided by large nares; loreal higher than long; preoculars 2; postoculars 3 (right) and 4 (left); anterior temporals 2, upper a narrow sliver approximately 20% the size of lower, lower excluded from contact with postoculars on right side, with point contact to second and third postoculars on left; posterior temporals 3, the most anterior lying on posterior slope of lower anterior temporal and in contact posteriorly with only the middle posterior temporal (Fig. 1). Supralabials 8, 4th and 5th contact eye; infralabials 9 (right) and 8 (left), four contact anterior chin shields. Posterior chinshields separated along their entire length by 1 + 1 + 2 intergenials; lateral gulars separated from posterior chinshields. Pits present in the loreal, preoculars, postoculars, anterior temporals, posterior temporals, parietals, and supralabials; absent from the rostral, nasals, internasals, prefrontals, frontal, supracaudals, infralabials, and chin shields; many small tubercles present on all head shields.

Ventrals 161; anal divided; subcaudals 63, excluding tip; subcaudal pits unobservable because horny epidermal layer missing for all subcaudals; subcaudals/(ventrals + subcaudals) = 0.28. Dorsal scales on tail reduced to six rows at level of subcaudal 18, reduced to four rows at level of subcaudal 41, and reduced to two rows at level of subcaudal 61.

Total length 1145 mm; snout-vent length 905 mm; tail length 240 mm (21% of total length); mass 285 g.

Maxillary teeth on left side 29, the last three enlarged.

Dorsal ground color in preservative yellow, varying from deep orange-yellow anteriorly to pale straw-yellow posteriorly. Interstitial skin bright orange anteriorly, becoming gray posteriorly. Head mustard yellow, darker than neck and anterior body, without dark postocular stripe; supralabials and infralabials with black posterior margins (Fig. 1A). Dorsum bears pattern of ~48 bands; each band spans middle 7-9 scale rows and is 1-2 scales long; mid-dorsal bands staggered against equal number of lateral blotches, each 3-4 scales high and 1-2 scales long. All bands and blotches formed by black outlining of affected scales; scale centers (and usually the posterior margins) retain ground color, imparting vague and indefinite appearance to bands and blotches (Fig. 2). First (reduced) dorsal band appears at level of ventral 15, first nearly complete dorsal band at level of ventral 28, and first trace of lateral blotch at level of ventral 30. Series of black dashes on first dorsal scale row up to level of ventral 25, each dash extending for 1-5 scales (Figs. 1A, 2). Tail with ~20 dark bands; bands increasingly reduced and poorly defined posteriorly. Venter yellow, fading from deep orange-yellow on chin to light straw yellow on tail, with gray flecks laterally at origin of dorsal banding and gradually filling in mid-ventrally; the last third of venter evenly, though not heavily, freckled with gray.

Color in life (from field notes).—“Dorsum mustard yellow with vague mid-dorsal and lateral blotches created by black outlining along the margins of affected scales. Dorsum becoming more orange anteriorly and top of head orange-brown. Sides turning to yellow. Venter bright yellow with a tendency to orange-yellow on chin and throat. Black flecks scattered on venter beginning ca. ¼-way down body and increasing in frequency posteriorly.”

Variation.—The paratype is smaller (total length ~810 mm, snout-vent length ~756 mm, tail length 54+ mm) than the holotype, has a broken tail, and is viscer-



Fig. 2. Holotype (BPBM 16539) of *Tropidonophis dolasii* in life.

ated anteriorly. It differs from the holotype in having prefrontals longer than wide; postoculars 4 on right side, 3 on left; anterior temporals two on each side, the upper (anteriormost) $\frac{2}{3}$ as large as the lower; posterior temporals two on each side; four infralabials in contact with anterior chin shields on left side, five on right; posterior chinshields meeting anteriorly and separated posteriorly by 1 + 2 intergenials; pits on head scales not observable because of loss of horny epidermal layers; ventrals 162; subcaudals 15 before tail broken; maxillary teeth on left side 32, the last 4 enlarged.

Dorsal ground color brown, no darker posteriorly than anteriorly; dorsum with ~51 bands, all bands and lateral blotches formed by dark brown, not black, margining and more solidly filled in than for holotype. Venter pale yellow anteriorly, changing to brown posteriorly. Barring on

lips dark brown, less distinct than in holotype due to general suffusion of brown pigment on the head.

Comparisons to other species.—*Tropidonophis dolasii* is distinguished from *T. negrosensis* in lacking a posterior reduction in dorsal scale rows; from *T. dahlii*, *T. dendrophiops*, *T. doriae*, and *T. hypomelas* in having 15 (vs. 17) dorsal scale rows; from *T. mairii* in having 2 (vs. 1) preocular; from *T. truncatus* in having 3 or 4 (vs. 2, rarely 3) postoculars; from *T. halmahericus*, *T. mcdowellii*, and *T. punctiventris* in having 8 (vs. 9) supralabials; from *T. aenigmaticus*, *T. novaeguineae*, and *T. picturatus* in having a larger number of ventral scales (161–162 vs. 140–152, 128–143, and 117–140, respectively); from *T. elongatus*, *T. montanus*, *T. multiscutellatus*, and *T. parkeri* in having fewer subcaudal scales (63 vs. 85–108, 71–89, 74–103, and 80–100, respec-

tively); and from *T. statisticus* in its larger size (~810–1145 mm vs. maximum of 870 mm), dorsal pattern of dark bands, offset with lateral blotches, on a yellow or brown ground (vs. uniform gray or brown with series of dorsal spots), and strongly barred labials (vs. unbarred).

Only five other species of *Tropidonophis* attain a size greater than one meter: *T. dahlii*, *T. doriae*, *T. elongatus*, *T. halmahericus*, and *T. montanus*. The first is restricted to New Britain and the last three to the western half of New Guinea or the Moluccas. Only *T. doriae* approaches the geographic range of *T. dolasii*, being found on the adjacent mainland of Milne Bay Province (Malnate and Underwood, 1988; O'Shea, 1996), but this species has 17 dorsal scale rows, no more than 153 ventrals in females, and no fewer than 71 subcaudals in females.

The conspicuous yellow dorsal and ventral coloring of *T. dolasii* (brown dorsally in the long-preserved paratype) and its pattern of lateral blotches combined with mid-dorsal bands are apparently unique among *Tropidonophis*. In other dorsally banded Papuan species (e.g., *T. doriae*, *T. hypomelas*), the bands are typically solid, instead of being formed by a network of darkened scale margins, and extend across the entire dorsum, instead of lying just on the mid-dorsal scale rows.

Ecological notes.—The holotype was collected in small-crowned lowland hill forest (Paijmans, 1975, 1976) on steep terrain at 1090 m. The collection site faces east but receives little direct sunlight because surrounding ridges and frequent clouds block the sun throughout much of the day. Nearest water source was a small (~30-cm wide) trickle among rocks in a narrow ravine approximately 50–100 m elevation below the collecting site. At the time of collection, the region had been in a month-long drought, although moisture was still present under logs and some rocks. Temperature varied from 15.8–21.0°C during the two weeks of our stay. The specimen

was active in mid-morning and attempted to escape. Other snakes occurring in the same area were *Aspidomorphus lineaticollis*, *Boiga irregularis*, and *Tropidonophis aenigmaticus*.

The paratype was noted to come from "transition oak-rain forest" and had an unidentified *Rana* in its stomach.

Etymology.—The name is a patronym honoring Dolasi Salepuna of Ulua, Ferguson Island, who was an invaluable field assistant and captured the holotype.

Distribution.—The species is known only from the uplands of eastern Ferguson Island and eastern Goodenough Island (Fig. 3). It likely occurs throughout the higher elevations of the D'Entrecasteaux Islands.

Remarks

In their revision of *Tropidonophis*, Malnate and Underwood (1988) placed considerable importance in their key on the numbers of anterior and posterior temporal scales, even while documenting that these characters show considerable intraspecific variation. We have not emphasized these scales for diagnosing *T. dolasii* because we are uncertain of their modal distribution, given our few specimens and the considerable variation these characters exhibit in the genus. In considering the holotype, it is especially uncertain 1) whether the third, small scale in the anterior-posterior series should properly be considered an anterior or posterior temporal, and 2) whether the first and the third small scales in the series are normally present or are aberrant divisions unique to that specimen. We have referred to the third, small scale as a posterior temporal based on the definition provided by Malnate and Underwood (1988: 75) that those scales meeting either the posterior slope of the supralabial apex or the anterior temporals constitute the posterior temporals. However, comparison with the paratype, whose temporals appear more normal in size and placement than those of the holotype, shows the region occupied by this

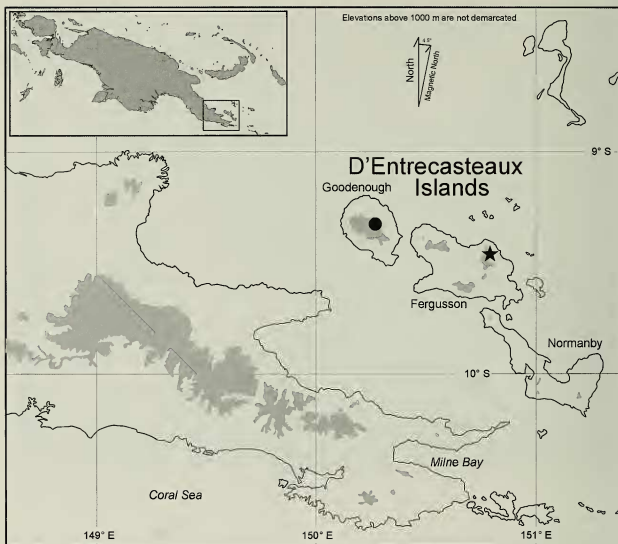


Fig. 3. Map of southeastern New Guinea showing type locality for *Tropidonophis dolasii* (star) on Oya Tabu (Mt. Kilkerran), Fergusson Island, and approximate locality for paratype (dot) on Goodenough Island, D'Entrecasteaux Islands.

small scale in the holotype to be part of the parietal in the paratype, suggesting this scale is not homologous with the other temporal scales. Further comparison of the two specimens shows the small anterior temporal of the holotype to be of similar placement but much smaller size than the corresponding scale in the paratype (~20% the size of the larger anterior temporal in the holotype vs. ~66% in the paratype). Given these observations, it seems likely that the temporal scalation seen in the holotype is aberrant.

If one assumes that the temporal scalation seen in the paratype is normal for the

species, then, among New Guinean *Tropidonophis*, having two anterior temporals would serve as a further character helping to distinguish *T. dolasii* from *T. statisticus*, *T. m. mairii*, *T. mcdowellii*, and *T. truncatus*. Similarly, two posterior temporals would be a further character diagnosing our species from *T. dahlii*, *T. hypomelas*, and *T. picturatus*.

The nearest relatives of *Tropidonophis dolasii* are not immediately evident. It shares with eight other species (*T. aenigmaticus*, *T. elongatus*, *T. montanus*, *T. multiscutellatus*, *T. novaeguineae*, *T. parkeri*, *T. picturatus*, and *T. statisticus*) the com-

mon scale conditions of 15 unreduced dorsal scale rows, two preoculars, three or more postoculars, and eight supralabials. Of these eight, only *T. elongatus* and *T. montanus* attain an equivalent size (the remainder never exceed 950 mm and individuals usually are much smaller). Only *T. elongatus*, *T. multiscutellatus*, and *T. novaeguineae* sometimes have dorsal bands, although the bands are solid and unlike the margined construction seen in *T. dolasii* and are superimposed on a brown or gray, instead of yellow, ground color. Of the eight species, all except *T. novaeguineae* typically bear a postocular dark stripe, not seen in *T. dolasii*. Ventral scale counts of *Tropidonophis dolasii* overlap only with those in *T. elongatus*, *T. montanus*, *T. parkeri*, and *T. statisticus*; subcaudal counts overlap only with *T. aenigmaticus* and *T. picturatus*; and ventrals + subcaudals overlap only with *T. aenigmaticus*, *T. multiscutellatus*, and *T. statisticus*. Given this chaotic pattern of character-state similarities and our small sample size, attempts to identify the sister taxon of *T. dolasii* would be premature.

Acknowledgments

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Appendix

Specimens examined

Tropidonophis aenigmaticus: BPBM 16534, E slope Oya Tabu, Fergusson Island, 9.4556°S, 150.7896°E, 1050 m, Milne Bay Prov., Papua New Guinea; BPBM 16535, Uluu, Fergusson Island, 9.4520°S, 150.8251°E, 0–10 m, Milne Bay Prov., Papua New Guinea; BPBM 16536, S slope Oya Waka, Fergusson Island, 9.4562°S, 150.5596°E, 980 m, Milne Bay Prov., Papua New Guinea; BPBM 16537, 17241, Saidowai, Normanby Island, 9.9637°S, 150.9546°E, 0–10 m, Milne Bay Prov., Papua New Guinea; BPBM 16538, 1.4 km NE Saidowai, Normanby Island, 9.9530°S, 150.9607°E, 40–80 m, Milne Bay Prov., Papua New Guinea; BPBM 17243, Sibonai, Normanby Island, 10.13578°S, 150.9708°E, 0–40 m, Milne Bay Prov., Papua New Guinea; BPBM 17242, 17244, S end Sewa Bay, Normanby Island, 10.0340°S, 150.9822°E, 60 m, Milne Bay Prov., Papua New Guinea.

Tropidonophis doriae: BPBM 13135, E branch Avi Avi River, 5.5 km S, 5.6 km W of Tekadu Airstrip, 7.735°S, 146.496°E, 120 m, Gulf Prov., Papua New Guinea.

Tropidonophis hypomelas: BPBM 12022, Weitin River Valley, 10 km N, 8.5 km W of river mouth, New Ireland, 4.533°S, 152.95°E, 250 m, New Ireland Prov., Papua New Guinea; BPBM 12163, Weitin River Valley, 8 km N, 7 km W of river mouth, New Ireland, 4.554°S, 152.964°E, 150 m, New Ireland Prov., Papua New Guinea.

Tropidonophis mairii: BPBM 3104, 3299–3300, Balimo, 8.00°S, 142.55°E, 10 m, Western Prov., Papua New Guinea.

Tropidonophis multiscutellatus: BPBM 5030, Biak Island, 1.02°S, 136.27°E, Papua, Indonesia; BPBM 3783, May River, 400 m, East Sepik Prov., Papua New Guinea; BPBM 17232–33, W Alotau, 10.3092°S, 150.3471°E, 5–10 m, Milne Bay Prov., Papua New Guinea; BPBM 5506, Wau, 7.343°S, 146.713°E, Morobe Prov., Papua New Guinea.

Tropidonophis picturatus: BPBM 4133, Garaina, 7.883°S, 147.142°E, 750 m, Morobe Prov., Papua New Guinea.

Tropidonophis statisticus: BPBM 17293–95, 17299–300, vic. Bunisi Village, 10.0171°S, 149.6002°E, 1420–1490 m, Milne Bay Prov., Papua New Guinea; BPBM 17296–98, Siyomu Village, 10.0145°S, 149.5970°E, 1300 m, Milne Bay Prov., Papua New Guinea; BPBM 4146, 5125, vic. Wau, 7.343°S, 146.713°E, 1600–1650 m, Morobe Prov., Papua New Guinea; BPBM 4128, 5459, 6239–40, Mt. Kaindi, 7.348°S, 146.667°E, 1800–2250 m, Morobe Prov., Papua New Guinea; BPBM 5458, 6337, Edie Creek, 7.358°S, 146.658°E, 2000–2200 m, Morobe Prov., Papua New Guinea; BPBM 6484, Bulldog Rd., 9 km SE Wau, 2200 m, Morobe Prov., Papua New Guinea; BPBM 3734, Sarawaget Range, 1920 m, Morobe Prov., Papua New Guinea; BPBM 5497, Kiliilo, Sarawaget Range, 2100 m, Morobe Prov., Papua New Guinea; BPBM 5498, SW Kabwum, Sarawaget Range, 2300 m, Morobe Prov., Papua New Guinea; BPBM 2272, Banz, 5.50°S, 144.35°E, 1680 m, Western Highlands Prov., Papua New Guinea; BPBM 2895, 16 km NW Banz, Western Highlands Prov., Papua New Guinea.